Maternal Psychological Characteristics and Intrauterine Growth Retardation

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Abstract: None available.

Full Text: Headnote ABSTRACT: Scores on six psychosocial questionnaires were compared to the risk of delivering an IUGR infant. In the second trimester, scales for stress, anxiety, social support, mastery, self esteem, and depression were prospectively administered to 1500 indigent women. In univariate analyses, significant relationships were found between IUGR and a poor score for mastery, stress, anxiety and self-esteem. The results were additive in that the more poor the scores, the higher the rate of IUGR. In a series of regression analyses controlling for height, weight, smoking, alcohol use, and the birth of a previous low birthweight infant, poor scores on 3 of the scales and an overall poor score remained significantly associated with IUGR, with odds ratios ranging from 1.68 to 2.34. INTRODUCTION In various studies evaluating the etiology of intrauterine growth retardation (IUGR), known causes such as medical disease, smoking, and low maternal weight account for a minority of cases. Demographic risk factors such as first pregnancy, low socioeconomic status, younger of older age and black race, despite their association with IUGR, offer little explanation as to etiology. We therefore questioned whether there were measurable psychosocial characteristics of women within these demographic groups which would distinguish between those women at risk for IUGR and those not at risk.[1,2] METHODS We have been involved in a longitudinal study of risk factors for IUGR in a mixed black-white indigent group of women who delivered between 1986 and 1988 at the University of Alabama at Birmingham.[3] For the analyses reported here, we selected 1545 multiparous women, a population enriched with women with various known risk factors for IUGR such as smoking, alcohol use, low maternal weight and height, and a previous low birthweight infant. The population studied was 69% black, 31% white, and all were para 1 or 2 prior to delivery. Multiple births were excluded from the analysis. Four of the psychosocial scales assessed in this study were administered at a scheduled project prenatal visit occurring at 24-26 weeks, and two were given at a 30-32 week visit. They included previously published scales for social support,[4] trait anxiety,[5] self-esteem,[6] mastery,[7] depression,[8] and an unpublished scale measuring stress. The latter characteristic was measured by a 4 item questionnaire. Because some women missed some visits, for each of the characteristics studies, there were between 1,200 and 1,300 questionnaires available for analysis. All six scales were completed by 1184 women. After observing the range of scores on each scale, the groups were divided into either high, medium or low, or high and low categories and the rate of IUGR in each subgroup was determined. The percent of women placed into the worst group ranged from 5% to 50%. A score for total psychosocial profile was derived by assigning one point for falling into the worst category on each of the individual scales. The total score, therefore, ranged from zero to six. A score of greater than or equal to three was defined as a poor overall psychosocial profile. For this study, the term IUGR is used to define infants born weighing less than the 15th percentile birth weight for gestational age based on Alabama standards for race, infant sex, and parity. The birth weights at each gestational age correspond roughly to previously reported 10th percentile birth weights for gestational age as defined by Williams et al[9] and are less than the 10th percentile of Miller and Merritt.[10] Gestational age is defined in completed weeks from the first day of the last menstrual period (LMP) when that gestational age was confirmed within two weeks by an ultrasound at less than 20 weeks gestational age. If the woman was unsure of her LMP, or if there was more than a two week discrepancy between the ultrasound generated gestational age and the LMP generated gestational age, the gestational age determined by the ultrasound was used to calculate the gestational age at delivery. For this study statistical

significance is defined as p <0.05. Univariate and linear regression techniques were used to determine the levels of significance and odds ratios presented in this study. In the multivariate analysis, results were controlled for maternal cigarette smoking, educational level, age, race, parity, and infant sex. RESULTS The relationship between scores on the various psychosocial scales and the percent of IUGR in the study group is shown in Figure 1. For each of the six characteristics measured, those women falling in the "worst" category had a greater risk of having an IUGR infant than women without this characteristic. The relationship of IUGR to the worst scores on the scales for stress, mastery, self esteem and trait anxiety was each statistically significant.

FIGURE 1
The Percent IUGR Found in Association with
Various Psychosocial Characteristics. For Each Characteristic,
the Portion of the Scale Considered "Poor" is at the Right.
L = low, M = medium, H = high, * = significant at p < 0.05.
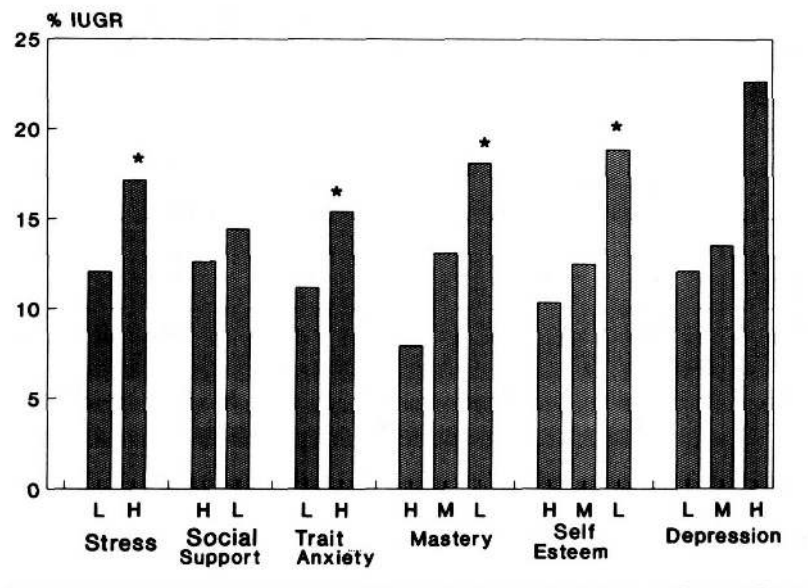
The additive effect of having one of more poor scores was then determined. In this analysis, a point was given each time the woman's score on an individual scale was in the "worst group." Women who had none or one psychosocial risk had an 11 percent chance of having an IUGR infant, while there was a nearly linear increase so that women who had 5 or more psychosocial risks had a 26 percent chance of having an IUGR infant. These results were significant (p <.03) as was the difference in the rate of IUGR between women with a score of ≥3 versus those with a score of ≤2. (p <0.01) To ensure that the apparent relationship between maternal psychosocial characteristics and IUGR was not caused by confounding with other factors known to be related to IUGR, we felt it important to repeat that analysis controlling for as many of these characteristics as possible. Odds ratios for IUGR were determined using logistic regression procedures controlling for maternal cigarette smoking, educational level, age, height, and weight. Since the definition of IUGR in this study is based on race, parity, and infant sex, we felt it unnecessary to control for these factors. Table 1 shows that even controlling for a number of potentially confounding variables, the results were similar to those seen in the univariate analyses. Odds ratios for IUGR for the worst group in each category ranged from 1.36 to 2.34. Statistically significant associations with IUGR were found for mastery, self esteem, and trait anxiety, while the tests for statistical significance for stress and depression were borderline. The increased rate of IUGR in women with a higher total psychosocial score vs. lower total scores was significant as well.

TABLE 1
The odds ratios and 95% confidence limits for IUGR
for various psychosocial characteristics

Characteristic	Odds Ratio	95% Confidence Limits
High stress vs. low stress	1.36	(0.93, 1.99)
High trait anxiety vs. low trait anxiety	1.47	(1.05, 2.05)
Low mastery vs. high mastery	2.34	(1.11, 4.95)
Low self-esteem vs. high self-esteem	1.91	(1.04, 3.49)
High depression vs. low depression	2.00	(0.94, 4.26)
Total score ≥ 3 vs. 0–2	1.68	(1.17, 2.41)

COMMENTS The relationship between pregnancy outcome and various maternal psychosocial characteristics has been debated for a number of years.[1,2,11] Previous studies, for the most part, have been criticized for lack of specificity of outcome variables, small numbers, retrospective study designs, as well as failure to control for other potentially confounding variables.[12] Nevertheless, there are at least 30 studies in which a relationship was suggested between some maternal psychologic characteristic and pregnancy outcome.[13] This study is unique for several reasons. First, the fact that all women were poor, in effect, controls for social class, and targets the demographic group at highest risk for IUGR. Its prospective design, the large number of women studied, the presence of a specific outcome variable, and controlling for other variables known to predict IUGR are all factors which add to the strength of this study. Six specific psychosocial characteristics were evaluated and for each, the worst group had the highest level of IUGR. Three of the six, anxiety, mastery, and self-esteem remained statistically significant predictors of IUGR even after controlling for other major risk factors. The relationship of depression and stress to IUGR were of borderline significance. Furthermore, those women with three or more poor characteristics had significantly more IUGR than women with two or less. Because the psychosocial prediction of IUGR remained statistically significant even after controlling for other major risk factors, these results suggest that the relationship between various psychosocial characteristics and decreased fetal growth may not be mediated solely through adverse maternal health characteristics such as smoking or decreased maternal weight.[14,15] Rather, these results support the contention that decreased fetal growth in the presence of psychologic distress may be mediated more directly, perhaps through a mechanism related to increased catecholamine production, vasoconstriction, and decreased uterine blood flow.[16] References

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